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1999

HAMILTON-WENTWORTH COLLISION REPORT

VOLUME 1: TRENDS AND LOCATIONS

PREPARED BY:

TRANSPORTATION, OPERATIONS AND
ENVIRONMENT

1999 Hamilton-Wentworth Collision Report

Prepared By:

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ACKNOWLEDGEMENTS

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1999 HAMILTON-WENTWORTH COLLISION REPORT - VOLUME 1

Introduction

The annual report is a summary of factors associated with traffic collisions that occurred in the Regional Municipality of Hamilton-Wentworth. Volume 1 contains the summary of data specific to 1999. The report contains overall frequencies and trends, plus location-specific data. This type of information is produced annually. A companion report (Volume 2) provides information about drivers, pedestrians, roads and weather based on a three year average.

The Regional Municipality of Hamilton-Wentworth is situated in southern Ontario at the westerly end of Lake Ontario. The following municipalities are located within the Region: the Town of Ancaster; the Town of Dundas; the Town of Flamborough; the Township of Glanbrook; the City of Hamilton and the City of Stoney Creek. The estimated total population of these combined localities was 467,799 in 1996.

Traffic collisions are a primary cause of accidental deaths, injuries and associated property losses. The intention of this report is to provide factual information to those agencies and persons concerned with the safety of the roadway transportation system within the Regional Municipality of Hamilton-Wentworth.

Traffic collisions frequently involve complex interactions between human behaviour, vehicle characteristics and environmental conditions. The factor or factors responsible for causing a collision are not always the most obvious nor are they always readily apparent. Caution should be exercised in drawing conclusions from the statistics presented in this report and conclusions should be drawn only with appropriate qualifications and supportive information.

The information presented in this report is based primarily upon motor vehicle collisions investigated by the Hamilton-Wentworth Regional Police. Citizen – reported collisions are not included in the statistics. The geographic area includes all roads in Hamilton-Wentworth, excluding collisions occurring on the following roads: Highway 6, north of Highway 403; Highway 8 in

Flamborough; the Queen Elizabeth Way; Highway 403 and on-ramps and off-ramps to Highway 403. Collisions occurring on service roads to the Queen Elizabeth Way are included.

1999 COMPARED WITH PREVIOUS YEARS

1. Overall Collisions

107 fewer collisions were reported in 1999 than in 1998, a decrease of 2%. The total number of collisions reported in 1999 was the lowest in the past 3 decades. When comparing 1995-1999 to previous years, one should consider the fact that a citizen's report form was introduced in 1994 to record collisions below the normal injury qualifications or minimal property damage limits. It has been noted by the Hamilton-Wentworth Regional Police Department that an undetermined number of reportable collisions are being recorded on the citizen's report form, thereby possibly lowering the true number of reportable collisions. However, these are primarily property damage collisions and this should not materially affect the number of injury collision reports.

The occurrence of injury collisions increased slightly from 1998, by 23 injury collisions, a 1.1% increase. The number of fatal collisions in 1999 was 17, no change over 1998.

2. Bicycle Injuries

The number of people injured in motor vehicle collisions while riding on a bicycle decreased by 25 from 1998 to 1999. There was 1 bicycle fatality in 1999.

3. Pedestrian Fatalities

In 1999 there were only 3 pedestrian fatalities, 2 less than 1998, and the lowest number (equalled in 1985 and 1994) recorded in the last 30 years.

4. Alcohol Involvement

Alcohol involvement in motor vehicle collisions has been, on average, steadily decreasing since 1978. In the years 1990 to present, alcohol involvement in collisions averaged 5.6 percent, compared to 9.1 percent for the previous 10 years. The rate was 5.0 percent in 1999, a slight increase over 1998. The involvement of young drivers (under 21) who had been drinking increased by 3% over 1998.

SUMMARY

- * In 1999, 5,004 reported traffic collisions occurred on municipal roadways in the Regional Municipality of Hamilton-Wentworth. These collisions resulted in:
 - 7 driver and 6 passenger fatalities
 - 1 cyclist fatality
 - 3 pedestrian fatalities
 - 2,741 driver, cyclist or passenger injuries (not including fatalities)
 - 274 pedestrian injuries (not including fatalities)
 - 14,389 persons (equal to approximately 3.0 percent of the Regional population) being involved in a reported traffic collision
- * The overall frequency of collisions in Hamilton-Wentworth is generally lower than other major Canadian municipalities.

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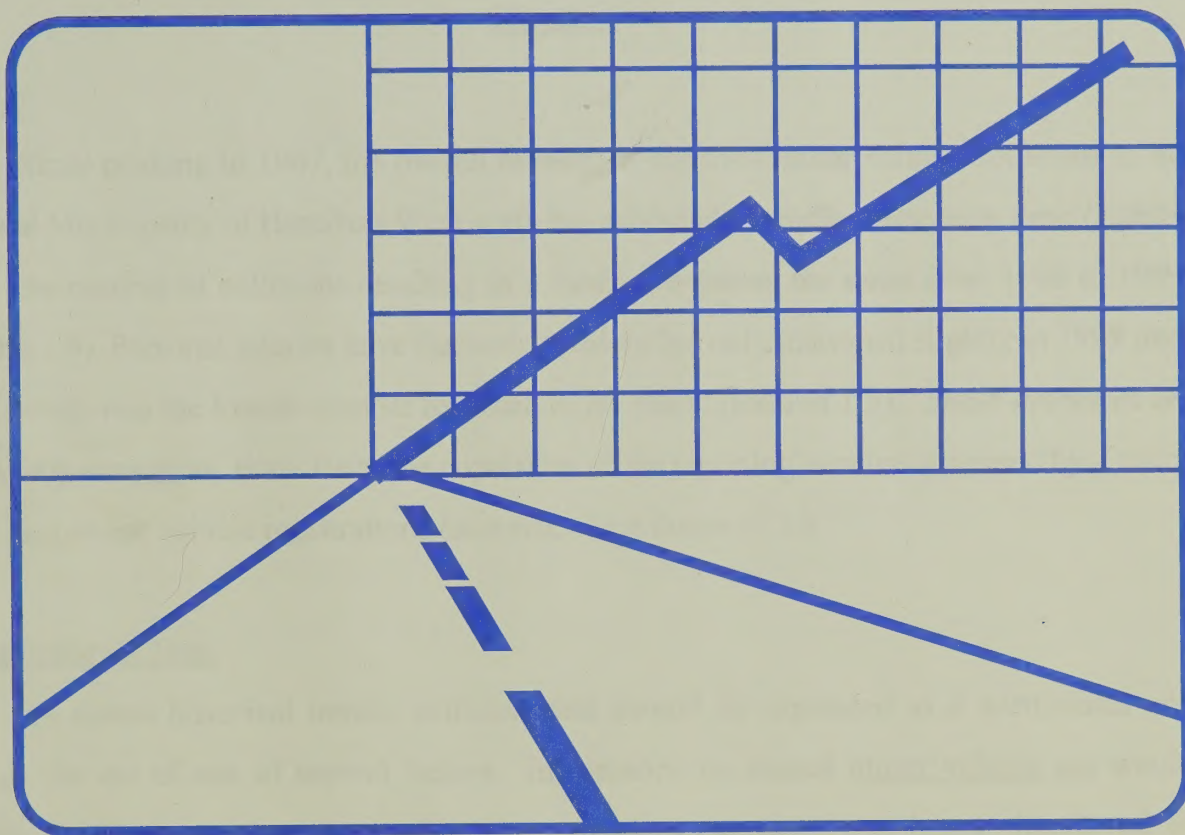
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1999 COMPARED WITH PREVIOUS YEARS

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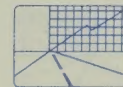
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Chapter One

Trends



Chapter 1

General

Since peaking in 1967, the overall number of reported motor vehicle collisions in the Regional Municipality of Hamilton-Wentworth has exhibited a steadily decreasing trend (Exhibit 1.4). The number of collisions resulting in a fatality remained the same from 1998 to 1999. (Exhibit 1.4). Personal injuries have fluctuated widely but only increased slightly in 1999 over 1998, which was the lowest number recorded in 30 years. (Exhibit 1.5). These decreases are particularly notable as, since 1966, the population of the reporting area has increased by a factor of 1.6 and motor vehicle registrations have risen by a factor of 3.0.

Normalizing the Data

To assess historical trends, collision data should be expressed as a normalized rate through the use of one of several factors. Information on annual motor vehicle use would provide the most accurate assessment of a motorist's exposure, and hence, likelihood of involvement in a collision. Motor vehicle registration data is somewhat less accurate as a normalizing factor, but is utilized later in this report since exposure information is not available. Population also provides a suitable and accurate normalizing factor. Exhibits 1.1, 1.2, 1.3 and associated analysis in the rest of this chapter refer to data which has been calculated on a population *rate* basis (based on 1996 population data), rather than on the basic number of occurrences.

Collisions

The overall motor vehicle collision rate is shown in Exhibit 1.1. As of January 1, 1978, the reporting level for property damage only collisions was raised from \$200.00 to \$400.00. On January 1, 1985, it was raised again from \$400.00 to \$700.00. The level was raised to \$1,000.00 in 1998. The reporting area also increased in 1974 and in 1997-1998. Considering these changes, the rate for total collisions shows a decline from 1977 to 1997, with the exception of 1993 and 1994. **1996, 1997, 1998 and 1999 show the lowest rates experienced in the 30 years for which records have been kept.** The rate of collisions involving injury or fatality shows a modest decline from 1973 to the present (Exhibit 1.1). Individual trends of injuries and fatalities are discussed below.



Injuries

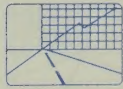
The rate of personal injury (Exhibits 1.2, 1.5) is rather volatile. However, since 1989, the rate of personal injury has been on the decline and the rate of personal injury in 1998 was the lowest it has been in the past 30 years, 1999 being just slightly higher. This volatility is likely related to the nature and severity of the collisions, which could be the result of a number of factors. The rate and number of pedestrian injuries (Exhibits 1.3, 1.6) shows a significant and continuing decline from 1969 to 1992 and a period of stability from 1992 to the present.

Of the 14,389 persons involved in collisions, in 1999, 3032 received injuries. The chance of an involved person sustaining injury in a collision varied from 17.3 percent for a motor vehicle passenger, to 90.8 percent for a pedestrian. The risk of injury is significantly higher for cyclists and pedestrians (Exhibit 1.8). The percentages are high for cyclists and pedestrians, as it is unlikely that this type of collision could occur with no personal injury and less than \$1000.00 total property damage.

Fatalities

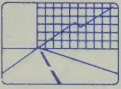
In 1999, 17 persons died in motor vehicle collisions in Hamilton-Wentworth. Fatal collisions are rare events and small changes in the number of fatalities cause large fluctuations in the fatality rate (Exhibit 1.2, 1.4). While injuries are close to an all-time low, fatalities are slightly higher than the experience of 1993 – 1996, prior to a substantial length of higher speed (80 km/hr) road being transferred from the Province to the Region.

In 1999, 3 pedestrians died in motor vehicle collisions. This is the lowest number (tied) recorded in the Region in the past 30 years. The fatality rate for pedestrians (Exhibit 1.3, 1.6) displays a general reducing trend, especially since 1978, although 1997 was slightly above the average for the past 10 years.



Alcohol Involvement

When viewed as a proportion of overall collisions, alcohol involvement (Exhibit 1.7) has been, on average, steadily decreasing since 1978. In the years 1989 to 1999, collision involvement remained relatively constant with an average of 5.6 percent which is much lower than the previous 11-year average of 10.1 percent. The 1999 percentage of 5.0 is a slight increase over 1998. The number of fatal collisions that were alcohol-related has been generally decreasing since 1984. While the actual number of alcohol-related fatal collisions is small (between 0 and 4 per year) an average of 14.7 percent of all fatal collisions between 1989 and the present have been alcohol-related, with the average for the past 3 years being 12.1 percent. In 1999, that statistic was 17.6 percent (3 collisions). The percentage of impaired/had-been-drinking drivers under the age of 21 has steadily been declining since 1979, with the exception of 1986 and 1999. In 1999 the percentage of impaired or had been drinking drivers, under the age of 21, was 7.8%.



MOTOR VEHICLE COLLISIONS: HISTORY OF RATES OF TOTAL COLLISIONS & COLLISIONS CAUSING INJURY/FATALITY

Exhibit 1.1

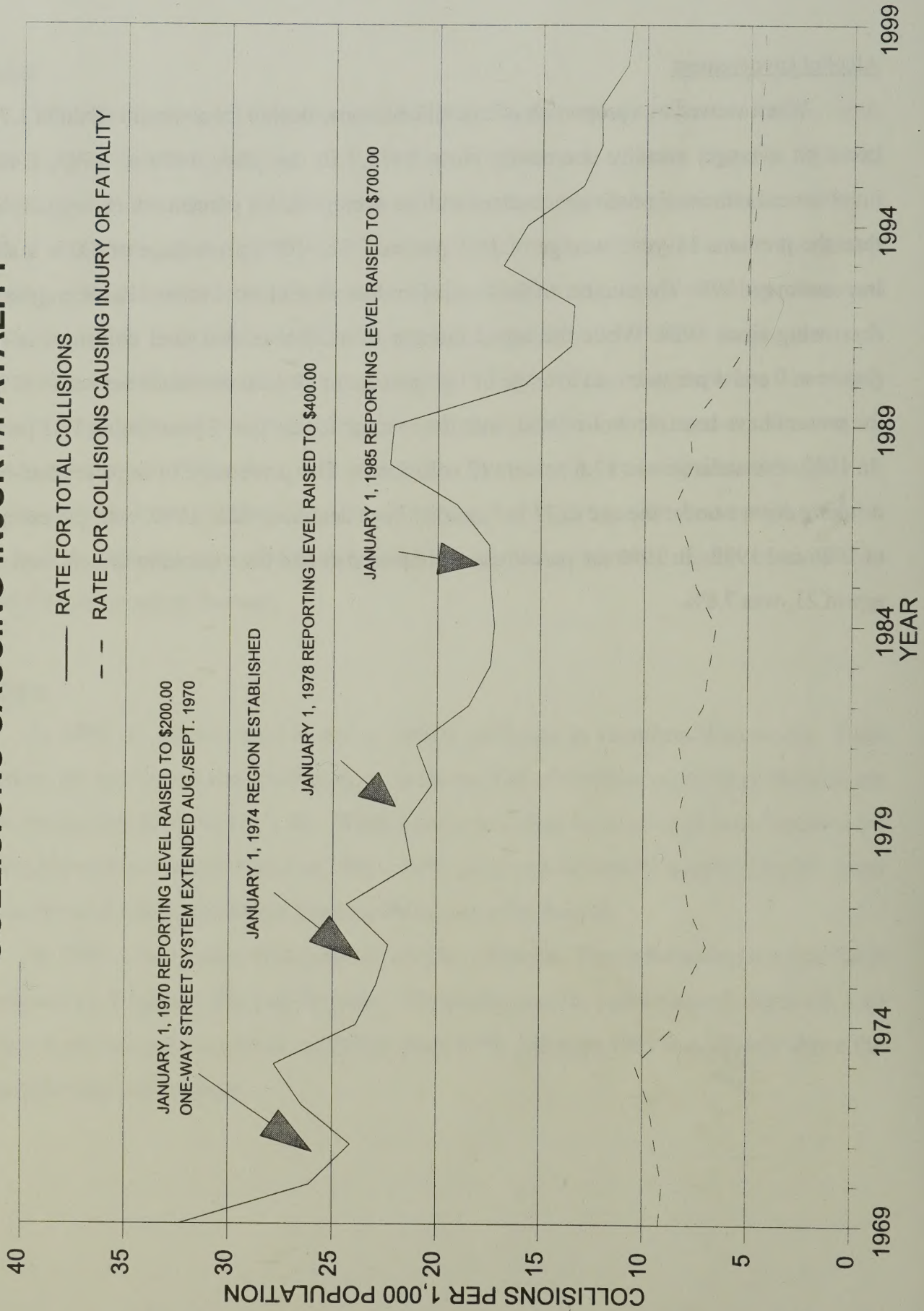
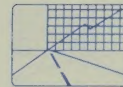
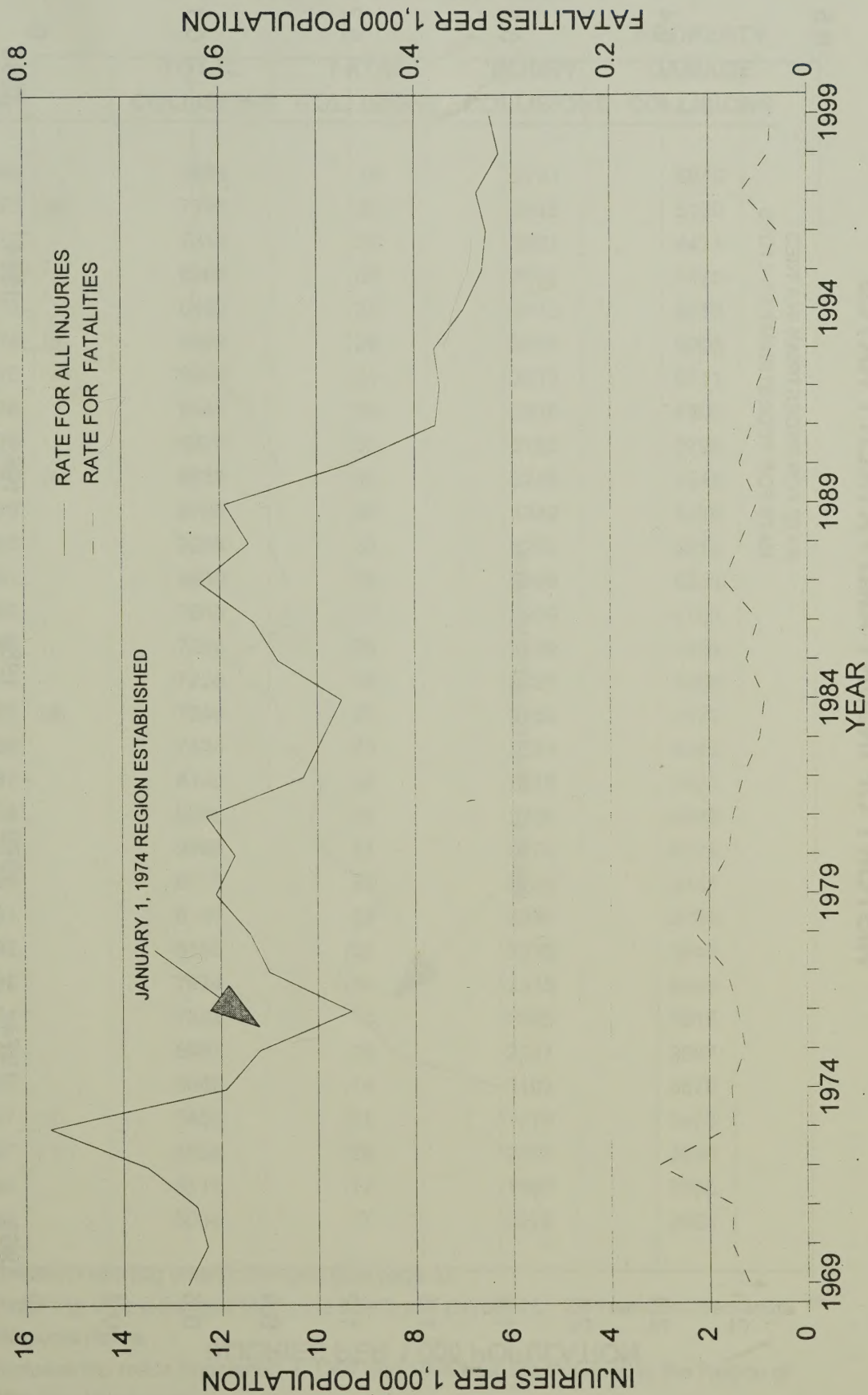


Exhibit 1.2

PERSONAL INJURIES/FATALITIES: HISTORY OF INJURY AND FATALITY RATES CAUSED BY MOTOR VEHICLE COLLISIONS



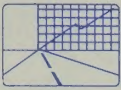
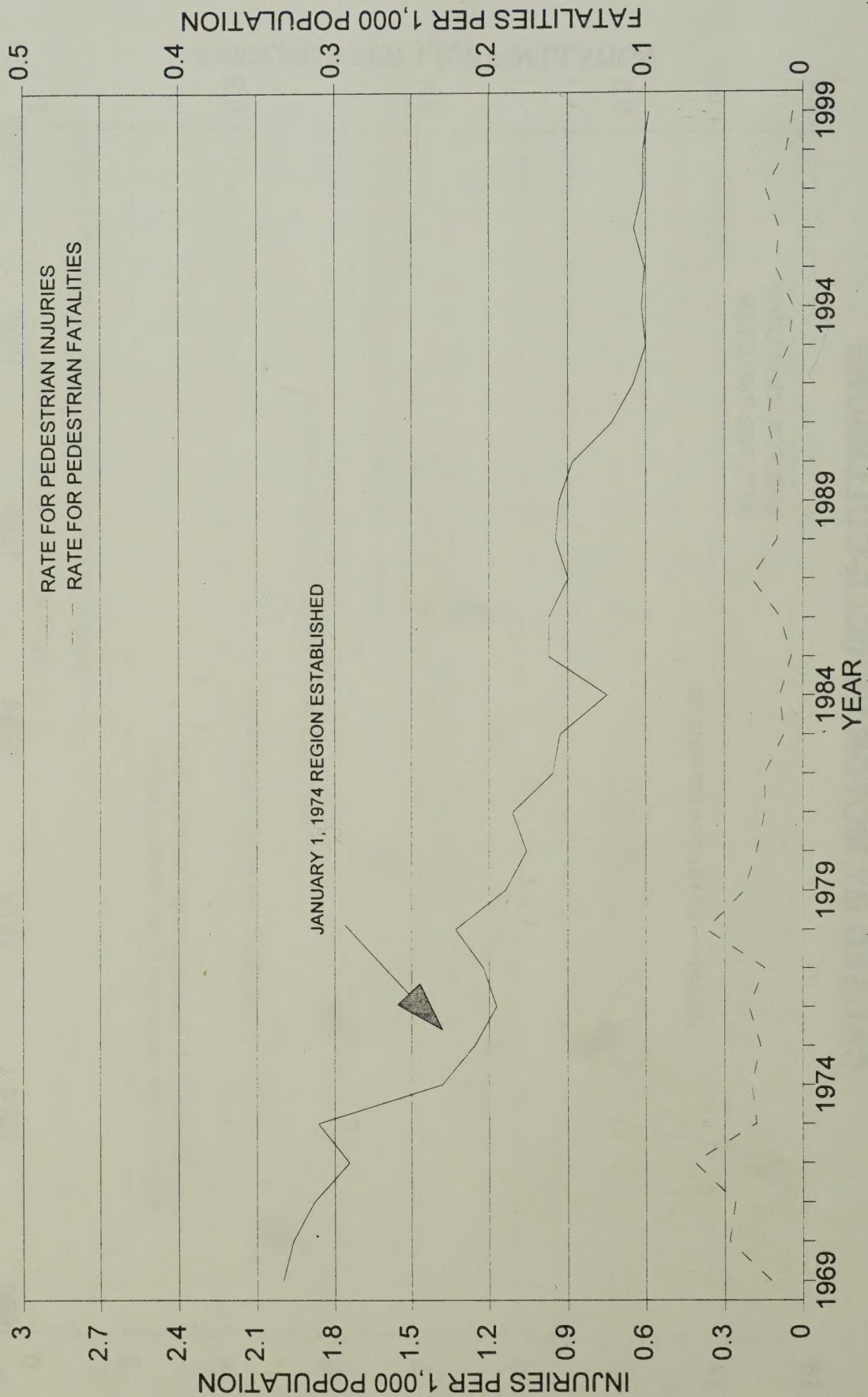
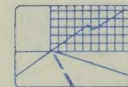


Exhibit 1.3
**PEDESTRIANS INVOLVED IN COLLISIONS:
HISTORY OF INJURY AND FATALITY RATES**





MOTOR VEHICLE COLLISION HISTORY

TRENDS

YEAR	TOTAL COLLISIONS	FATAL COLLISIONS	INJURY COLLISIONS	PROPERTY DAMAGE COLLISIONS
1969	9589	19	2721	6849
1970 (a)	7799	23	2676	5100
1971	7314	22	2821	4471
1972	8065	39	2901	5125
1973	8499	23	3143	5333
1974 (b)	9599	29	3364	6206
1975	9354	24	3219	6111
1976	9146	28	2816	6302
1977	10011	33	3182	6796
1978 (a)	8636	45	3246	5345
1979	8798	39	3389	5370
1980	9305	33	3253	5019
1981	8660	28	3398	5234
1982	7663	23	2939	4701
1983	7268	20	2839	4409
1984	7228	18	2726	4484
1985 (a)	7346	21	3153	4172
1986	7434	21	3331	4082
1987	8140	35	3615	4491
1988	9586	22	3285	6279
1989	9566	21	3372	6173
1990	6917	25	2751	4141
1991	6145	25	2331	3789
1992	6180	22	2312	3846
1993	7674	15	2313	5346
1994	7233	13	2205	5015
1995	5987	19	2111	3857
1996	5687	14	2103	3570
1997 (d)	5453	21	1979	3453
1997 (c)	5693	28	2075	3590
1998	5111	17	1999	3095
1999	5004	17	2022	2952

(a) Collision reporting criteria changed (see page 3).

(b) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.

(c) Includes the roads transferred in 1997 and 1998 from the Province to the Region of Hamilton-Wentworth.

(d) Previous road network

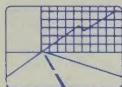


Exhibit 1.5

HISTORY OF PERSONAL INJURIES AND FATALITIES CAUSED BY MOTOR VEHICLE COLLISIONS

YEAR	TOTAL COLLISIONS	PERSONS INJURED	PERSONAL INJURIES/1,000 POPULATION	NUMBER OF FATALITIES	FATALITIES/ 100,000 POPULATION	FATALITIES/ 10,000 REGISTERED VEHICLES	
1965	10783	3824	13.4	27	9.5	2.6	
1966	9950	3746	12.6	28	9.8	2.6	
1967	9106	3484	12.2	39	13.7	3.6	
1968	8983	3574	12.8	22	7.9	1.9	
1969	9589	3768	12.7	19	6.4	1.6	
1970 (a)	7799	3717	12.3	23	7.5	2.0	
1971	7314	3876	12.5	23	7.0	1.9	
1972	8065	4055	13.5	46	15.3	3.4	(b)
1973	8499	4951	15.5	23	7.2	1.6	
1974 (c)	9599	4678	11.9	31	7.9	2.0	(b)
1975	9354	4474	11.2	26	6.5	1.6	(b)
1976	9146	3811	9.3	29	7.1	1.8	(b)
1977	10011	4513	11.0	34	8.3	2.0	(b)
1978 (a)	8636	4635	11.4	47	11.6	2.1	(d)
1979	8798	4923	12.1	42	10.3	2.2	(d)
1980	8305	4800	11.7	33	8.0	1.4	(d)
1981	8660	5015	12.3	31	7.6	1.1	(d)
1982	7663	4175	10.3	27	6.6	0.9	
1983	7268	4041	9.9	20	4.9	1.1	(e)
1984	7228	3855	9.5	18	3.8	0.8	(e)
1985 (a)	7346	4529	10.8	26	6.2	1.2	(e)
1986	7434	4758	11.3	21	5.0	0.9	(e)
1987	8140	5220	12.4	36	8.4	1.5	(e)
1988	9586	4898	11.4	29	6.8	1.2	(e)
1989	9566	5145	11.9	22	5.1	0.9	(e)
1990	6917	4053	9.4	30	6.9	1.2	(e)
1991	6415	3420	7.6	25	5.5	1.0	(d)
1992	6180	3439	7.5	23	5.0	0.8	(e)
1993	7674	3421	7.6	16	3.5	0.5	(e)
1994	7233	3213	7.4	13	2.8	0.4	(e)
1995	5987	3061	6.7	20	4.3	0.6	(e)
1996	5687	3066	6.6	14	2.9	0.4	(e)
1997 (f)	5693	3173	6.8	31	6.6	1.4	(e)
1998	5111	2945	6.3	18	3.8	0.5	(e)
1999	5004	3032	6.5	17	3.6	0.5	(e)

(a) Collision reporting criteria changed (see page 3).

(b) Registration estimated from total Ontario registrations.

(c) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.

(d) Registration data from licence information.

(e) Registration data from licence information for Wentworth County.

(f) Includes roads transferred in 1997 and 1998 from the Province to the Region of Hamilton-Wentworth.

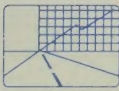


Exhibit 1.6

HISTORY OF PEDESTRIAN AND CYCLIST INJURIES AND FATALITIES

YEAR	COLLISIONS INVOLVING PEDESTRIANS			COLLISIONS INVOLVING CYCLISTS		
	PEDESTRIANS	PEDESTRIANS	PEDESTRIAN	PEDESTRIANS	CYCLISTS	CYCLIST
	PEDESTRIANS	INJURED	FATALITIES	CYCLISTS	INJURED	FATALITIES
	(c)	(a)		(c)	(a)	
1969		602	6		91	2
1970		586	14		101	1
1971		570	13		155	2
1972		530	21		156	2
1973		569	9		197	1
1974	(b)	555	13		192	3
1975		513	11		235	0
1976		480	14		195	0
1977		503	10		193	3
1978		542	25		162	1
1979		464	15		177	4
1980		434	12		178	1
1981		458	10		159	1
1982		396	10		252	2
1983		387	5		200	2
1984		314	6		175	1
1985		410	3		239	2
1986	384	412	6	229	228	2
1987	379	383	14	244	244	2
1988	401	406	7	239	225	0
1989	411	403	7	164	154	3
1990	381	383	7	208	195	0
1991	332	330	10	193	185	3
1992	300	297	9	219	209	3
1993	299	291	4	201	183	0
1994	290	283	3	196	185	2
1995	293	286	8	163	152	1
1996	303	302	7	150	135	1
1997	(d)	294	11	158	140	1
1998	(d)	281	5	197	177	4
1999		302	3	143	152	1

(a) One or more pedestrian/cyclist could be involved and a fatality/injury may not have occurred. Includes injuries and fatalities.

(b) Prior to this year, reporting was for the City of Hamilton only.

(c) This information was not available until 1986.

(d) Includes roads transferred in 1997 and 1998 from the Province to the Region of Hamilton-Wentworth.

HISTORY OF ALCOHOL - RELATED MOTOR VEHICLE COLLISIONS

YEAR	TOTAL REPORTED COLLISIONS	TOTAL ALCOHOL- RELATED COLLISIONS	% OF TOTAL COLLISIONS INVOLVING ALCOHOL	% IMPAIRED OR HAD BEEN DRINKING DRIVERS UNDER THE AGE OF 21	TOTAL FATAL COLLISIONS	ALCOHOL- RELATED FATAL COLLISIONS (a)	% FATAL COLLISIONS HAVING ALCOHOL INVOLVED
1978	8636	1128	13.1	22.1	45	11	24.4
1979	8798	1139	12.9	22.1	39	5	12.8
1980	8305	929	11.2	18.7	33	11	33.3
1981	8660	1053	12.2	16.4	28	8	28.6
1982	7663	895	11.7	19.0	23	3	13.0
1983	7268	765	10.5	18.6	20	5	25.0
1984	7228	729	10.1	15.0	18	5	27.8
1985	7346	644	8.8	12.7	21	5	23.8
1986	7434	596	8.0	20.5	21	4	19.0
1987	8140	589	7.2	11.9	35	5	14.3
1988	9586	582	6.1	9.9	22	2	9.1
1989	9566	542	5.7	6.7	21	6	28.6
1990	6917	430	6.2	6.6	25	4	16.0
1991	6145	385	6.3	7.6	25	3	12.0
1992	6180	398	6.4	2.1	22	0	0.0
1993	7674	397	5.1	5.5	15	4	26.7
1994	7233	359	5.0	4.7	13	2	15.4
1995	5987	327	5.5	3.7	19	1	5.3
1996	5687	340	5.9	7.9	14	3	21.4
1997(b)	5693	304	5.3	7.8	28	2	7.1
1998(b)	5111	249	4.9	4.8	17	2	11.8
1999(b)	5004	253	5.0	7.8	17	3	17.6

(a) Includes drivers classified as impaired due to alcohol or classified as had been drinking.

(b) Includes roads transferred in 1997 and 1998 from the Province to the Region of Hamilton-Wentworth.

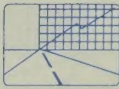


Exhibit 1.8

TRENDS

INJURY STATUS OF ALL PERSONS INVOLVED

DESCRIPTION OF PERSONS INVOLVED	PERSONS INVOLVED	PERSONAL INJURIES & FATALITIES	% OF PERSONS INJURED/ PERSONS INVOLVED	TYPE OF INJURY*			
				FATAL	MAJOR	MINOR	MINIMAL
DRIVER**	8767	1731	19.7%	7	67	702	955
CYCLIST	153	131	85.6%	1	4	67	59
PASSENGER	5164	893	17.3%	6	45	321	521
PEDESTRIAN	305	277	90.8%	3	26	155	93
TOTAL	14389	3032	21.1%	17	142	1245	1628

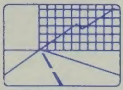
FOR APPROXIMATELY EVERY 32 RESIDENTS OF THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH, 1 PERSON WAS INVOLVED IN A MOTOR VEHICLE COLLISION IN 1999.

THERE WAS APPROXIMATELY A 1 IN 5 CHANCE THAT A PERSON INVOLVED IN A TRAFFIC COLLISION WOULD BE INJURED.

* Definitions of injury types:

Major: Person admitted to the hospital for treatment of injuries received in the collision.
 Minor: Person went to the hospital for medical treatment but was released without being admitted.
 Minimal: Person did not go to a hospital for medical treatment upon leaving the scene of the collision.

**does not include hit & run or Failed To Remain drivers.



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TRENDS

THE STATUS OF ALL PERSONS INVOLVED

PERSON INFORMATION				STATUS			REMARKS
NAME	DOB	SEX	AGE	STATUS	STATUS	STATUS	
1	1975	M	24	1	2	3	1
2	1975	M	24	1	2	3	1
3	1975	M	24	1	2	3	1
4	1975	M	24	1	2	3	1
5	1975	M	24	1	2	3	1
6	1975	M	24	1	2	3	1
7	1975	M	24	1	2	3	1
8	1975	M	24	1	2	3	1
9	1975	M	24	1	2	3	1
10	1975	M	24	1	2	3	1

THE STATUS OF ALL PERSONS INVOLVED

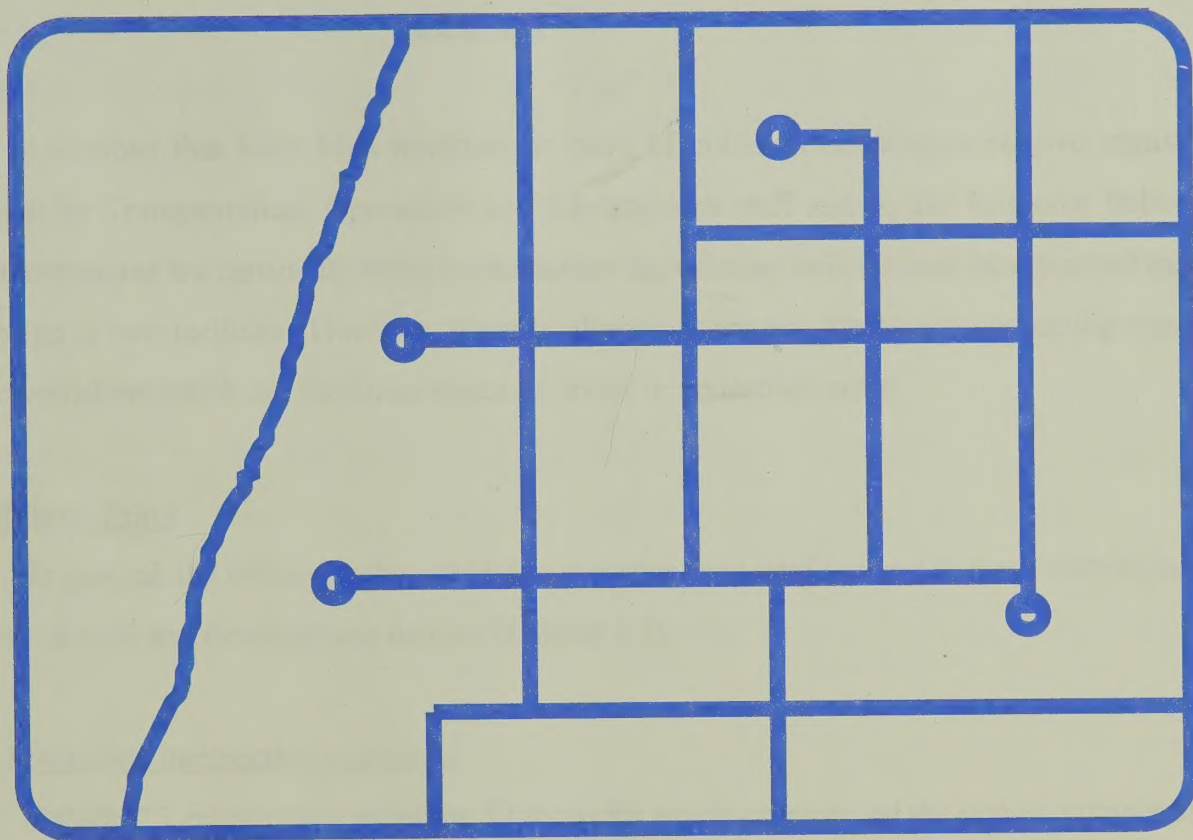
THE STATUS OF ALL PERSONS INVOLVED

THE STATUS OF ALL PERSONS INVOLVED

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Chapter Two

Locations



Chapter 2

General

Locations that have high numbers or rates of collision occurrence receive regular attention by Transportation, Operations and Environment staff and by the Regional Police. Countermeasures are constantly being implemented for existing facilities and incorporated into the design of new facilities. However, physical alterations are not effective in preventing many traffic collisions which are the direct result of driver or pedestrian error.

Area Municipality

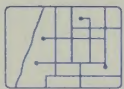
In general, the collision rates are higher in larger municipalities and in those with higher degrees of road and development density (Exhibit 2.1).

High Frequency Intersection Locations

Exhibit 2.2 represents a list of the 50 locations which experienced the highest number of collision occurrences in 1999. All high collision locations are signalized. All 1999 collisions occurring at traffic signals were subjected to the control chart analysis technique (Exhibit 2.3) which analyzes rates based on volumes of traffic. Exhibit 2.3 also provides a five-year average for each intersection.

Exhibit 2.4 shows two-way stop locations and all-way stop locations with the highest collision frequencies. Collision rate data are not comprehensive, in that traffic volume information is only collected for the busier or more important intersections in each classification.

Exhibits 2.5 and 2.6 provide data on rates of collision occurrence on roadway sections, showing the 50 sections of major roadway with the highest rates. Exhibit 2.5 shows rates which are calculated including collisions at unsignalized intersections but excluding collisions at signalized intersections. Exhibit 2.6 shows rates which are calculated excluding any collisions occurring within 9 m of an intersection (signalized or unsignalized).



Exhibits in this chapter do not necessarily represent priority lists for improvements as other factors must be taken into account such as cost-benefit considerations or the deployment of other collision countermeasures which may be more cost-effective.

In many cases, since the data are for 5 years, countermeasures have already been implemented or these locations are under consideration for various forms of improvement on a priority basis.

Comparison of Hamilton and Hamilton-Wentworth with other Cities

On the basis of total collisions per 1,000 population, Hamilton and Hamilton-Wentworth are very close to the lowest rates in Canada (Exhibit 2.7). On the basis of injury collisions per 1,000 population, the City and Region are better than average.

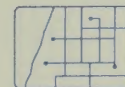


Exhibit 2.1

COLLISIONS vs AREA MUNICIPALITY

MUNICIPALITY	CLASS OF COLLISION (a)				COLLISION RATE PER 1,000 POP.(c)
	FATAL	NON-FATAL INJURY	PROPERTY DAMAGE ONLY	ALL COLLISIONS (b)	
ANCASTER	2	86	137	227	9.7
DUNDAS	0	49	80	129	5.6
FLAMBOROUGH	1	86	127	215	6.3
GLANBROOK	2	59	69	130	12.3
CITY OF HAMILTON	8	1516	2240	3773	11.7
STONEY CREEK	4	226	299	530	9.8
TOTAL FOR THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH	17	2022	2952	5004	10.7

(a) Collisions reported to the Hamilton-Wentworth Regional Police only; areas patrolled by the Provincial Police (e.g. Highway 403, Q.E.W.) are not included.

(b) Location data missing from a small number of collisions.

(c) Population figure extrapolated based on 1996 population data for each municipality.

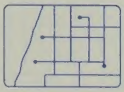
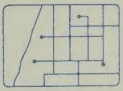


Exhibit 2.2

INTERSECTIONS WITH THE HIGHEST NUMBER OF
COLLISIONS IN 1999 (a)

INTERSECTION (b)	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5-YEAR AVERAGE
1 BURLINGTON & KENILWORTH	TRAFFIC SIGNAL	27	12.8
2 HUNTER ST H & JOHN H	TRAFFIC SIGNAL	20	13.6
3 CENTENNIAL PKWY & QUEENSTON (SC)	TRAFFIC SIGNAL	17	18.2
4 MAIN H & VICTORIA AV H	TRAFFIC SIGNAL	17	14.8
5 KENILWORTH & MAIN H	TRAFFIC SIGNAL	16	13.8
6 NASH & QUEENSTON H	TRAFFIC SIGNAL	15	16.4
7 HWY 20 S N OF 53 & MUD	TRAFFIC SIGNAL	13	13.6
8 KING H & WELLINGTON H	TRAFFIC SIGNAL	13	8.2
9 MOHAWK H & UPPER WENTWORTH	TRAFFIC SIGNAL	13	11.4
10 BARTON H & CENTENNIAL PKWY	TRAFFIC SIGNAL	12	11.6
11 BARTON H & WOODWARD H	TRAFFIC SIGNAL	12	9.4
12 DUNDURN & MAIN H	TRAFFIC SIGNAL	12	13.8
13 FENNELL & UPPER JAMES	TRAFFIC SIGNAL	12	8.4
14 JOHN H & MAIN H	TRAFFIC SIGNAL	12	11.2
15 LOCKE & YORK BL	TRAFFIC SIGNAL	12	10.4
16 ABERDEEN H & LONGWOOD	TRAFFIC SIGNAL	11	7.6
17 BARTON H & NASH	TRAFFIC SIGNAL	11	6.8
18 BARTON H & STRATHEARNE AV	TRAFFIC SIGNAL	11	9.6
19 CENTENNIAL PKWY & SOUTH SERVICE (SC)	TRAFFIC SIGNAL	11	9.0
20 DUNDURN & KING H	TRAFFIC SIGNAL	11	15.4
21 GRAYS S & HWY 8 (SC)	TRAFFIC SIGNAL	11	9.8
22 HWY 403 & MAIN H	TRAFFIC SIGNAL	11	7.0



INTERSECTION (b)	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5-YEAR AVERAGE
23 HWY 5 & HWY 52	TRAFFIC SIGNAL	11	8.8
24 MACKLIN & MAIN H	TRAFFIC SIGNAL	11	9.0
25 ABERDEEN H & QUEEN H	TRAFFIC SIGNAL	10	7.0
26 BARTON H & KENILWORTH	TRAFFIC SIGNAL	10	9.0
27 COOTES & MAIN H	TRAFFIC SIGNAL	10	7.0
28 GAGE & MAIN H	TRAFFIC SIGNAL	10	8.0
29 GREENFORD DR & QUEENSTON H	TRAFFIC SIGNAL	10	8.6
30 KING H & VICTORIA AV H	TRAFFIC SIGNAL	10	8.6
31 MAIN H & SANFORD	TRAFFIC SIGNAL	10	8.0
32 MOHAWK H & UPPER GAGE	TRAFFIC SIGNAL	10	7.2
33 BARTON H & GAGE	TRAFFIC SIGNAL	9	9.2
34 BURLINGTON & PARKDALE	TRAFFIC SIGNAL	9	8.2
35 CANNON & GAGE	TRAFFIC SIGNAL	9	8.0
36 FENNELL & UPPER OTTAWA	TRAFFIC SIGNAL	9	7.2
37 FENNELL & UPPER SHERMAN	TRAFFIC SIGNAL	9	6.8
38 GAGE & KING H	TRAFFIC SIGNAL	9	7.0
39 GOLF LINKS & STONE CHURCH	TRAFFIC SIGNAL	9	6.4
40 HWY 20 S N OF 53 & HWY 53	TRAFFIC SIGNAL	9	11.0
41 INDUSTRIAL & OTTAWA	TRAFFIC SIGNAL	9	6.0
42 JAMES ST H & MAIN H	TRAFFIC SIGNAL	9	5.6
43 KING H & QUEEN H	TRAFFIC SIGNAL	9	6.4
44 KING H & QUIGLEY	TRAFFIC SIGNAL	9	7.8
45 LONGWOOD & MAIN H	TRAFFIC SIGNAL	9	9.8
46 CANNON & CATHARINE	TRAFFIC SIGNAL	8	5.0
47 CENTENNIAL PKWY & DELAWANA	TRAFFIC SIGNAL	8	7.4
48 COOTES & OLYMPIC	TRAFFIC SIGNAL	8	5.8
49 DEWITT & HWY 8 (SC)	TRAFFIC SIGNAL	8	6.2
50 FIFTY & HWY 8 (SC)	TRAFFIC SIGNAL	8	3.8

- (a) Only collisions occurring within 31 feet (9.5 m) of the intersection are defined as being "in" the intersection and are included in this list.
- (b) All intersections are in the City of Hamilton unless otherwise indicated:
(SC) Stoney Creek.

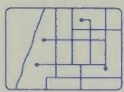
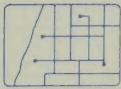


Exhibit 2.3

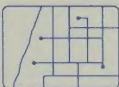
SIGNALIZED INTERSECTIONS WITH THE HIGHEST COLLISION RATES FROM 1995 to 1999

	INTERSECTION	RL (a)	RC (b)	RL/RC	AVG. 3-YR AWDT (c)	NUMBER OF COLLISIONS					5-YR AVG.	COMMENT
						1995	1996	1997	1998	1999		
1	HWY 5/HWY 8 (F)	1.85	1.08	1.71	11766	15	7	13	2	1	7.6	
2	BURLINGTON ST & HWY 5/HWY 52/WESTOVER	1.75	0.89	1.96	20868	7	8	9	13	27	12.8	(o)
3	QUEENSDALE AVE & UPPER GAGE AVE	1.53	0.93	1.63	17986	14	14	12	5	3	9.6	(e)
4	HUNTER ST & JOHN ST	1.35	0.81	1.65	28887	12	18	11	7	20	13.6	(g,i)
5	BARTON ST & STRATHEARNE AVE	1.24	0.88	1.41	22132	6	13	8	10	11	9.6	
6	WILSON ST & JOHN ST	1.22	0.86	1.41	23495	12	21	8	6	3	10.0	(d)
7	BURLINGTON ST & PARKDALE AVE	1.19	0.92	1.30	19226	5	7	14	6	8	8.0	(o)
8	QUEENSTON RD & NASH RD	1.18	0.75	1.58	39627	19	20	13	15	15	16.4	(l)
9	HWY 53/HWY 56 & HWY 20 S N OF 53	1.18	0.83	1.42	26652	9	13	14	10	9	11.0	
10	MUD ST & PARAMOUNT DR (W)	1.16	1.01	1.15	14273	8	6	8	6	1	5.8	
11	KING ST & PARKDALE AVE	1.16	0.81	1.42	29162	16	14	11	10	8	11.8	(k)
12	MAIN ST & MACKLIN ST	1.11	0.87	1.28	23161	7	8	8	11	11	9.0	
13	MAIN ST & VICTORIA AVE	1.08	0.75	1.44	39107	9	7	29	12	17	14.8	
14	HWY 2 (A) & HWY 53	1.05	0.80	1.31	30519	16	15	20	3	2	11.2	(p)
15	CANNON ST & GAGE AVE	1.04	0.88	1.19	21915	8	8	6	9	9	8.0	(h)
16	CHARLTON AVE & HESS ST	1.04	1.20	0.86	8827	1	3	2	6	4	3.2	(g)
17	BARTON ST & JOHN ST	1.04	0.93	1.11	18218	8	4	8	7	6	6.6	(g)
18	MUD ST & HWY 20 S N OF 53	0.95	0.74	1.28	41408	10	15	11	20	13	13.8	(n)
19	BARTON ST & GAGE AVE	0.93	0.82	1.13	28404	12	15	4	6	9	9.2	(h)
20	KING ST (SC) & GREEN RD	0.92	1.04	0.89	13016	6	5	1	2	7	4.2	
21	BARTON ST & BAY ST	0.92	1.15	0.80	9972	4	6	3	2	1	3.2	
22	KING ST & DUNDURN ST	0.89	0.72	1.25	48674	20	11	16	18	11	15.2	
23	MUD ST & PARAMOUNT DR (E)	0.89	0.84	1.06	25649	99	99	99	99	8	8.0	
24	QUEENSDALE AVE & UPPER WENTWORTH ST	0.89	1.04	0.85	12869	7	1	5	2	5	4.0	



INTERSECTION	RL (a)	RC (b)	RL/RC	AVG 3-YR AWDT (c)	NUMBER OF COLLISIONS					COMMENT
					1995	1996	1997	1998	1999	
25 QUEENSTON RD (SC) & CENTENNIAL PKWY	0.88	0.69	1.27	58835	22	22	22	8	16	18.0
26 KENTLEY DR & NASH RD	0.87	0.99	0.88	15118	5	14	3	0	1	4.6 (j)
27 LIMERIDGE RD & UPPER SHERMAN AVE	0.85	0.97	0.88	16069	8	6	8	2	0	4.8 (q)
28 MAIN ST & JOHN ST	0.85	0.76	1.11	36944	13	11	12	7	12	11.0
29 STONE CHURCH RD & UPPER WELLINGTON ST	0.85	1.00	0.85	14791	6	5	2	4	5	4.4
30 YORK BLVD & LOCKE ST	0.85	0.77	1.10	35018	12	11	10	7	12	10.4 (f)
31 RENNIE ST & WOODWARD AVE	0.84	1.11	0.76	10855	3	5	5	1	2	3.2
32 MOHAWK RD & UPPER OTTAWA ST	0.83	0.79	1.04	31730	3	4	5	28	6	9.2
33 BARTON ST & VICTORIA ST	0.83	0.86	0.97	24173	8	10	7	6	4	7.0
34 KING ST & JOHN ST (H)	0.81	0.83	0.98	26712	0	7	6	15	10	7.6
35 KING ST & QUIGLEY RD	0.81	0.82	0.98	27644	12	4	8	6	9	7.8
36 ABERDEEN AVE & DUNDURN ST	0.81	0.83	0.97	26990	11	8	9	8	2	7.6 (m)
37 KING WILLIAM ST & CATHARINE ST	0.80	1.37	0.59	6427	1	3	2	2	1	1.8 (d)
38 INDUSTRIAL DR & OTTAWA ST	0.80	0.88	0.91	22219	4	6	4	8	9	6.2
39 HUNTER ST & CAROLINE ST	0.80	1.31	0.61	7171	5	0	2	1	2	2.0
40 MAIN ST & KENILWORTH AVE	0.80	0.71	1.12	49552	13	19	16	5	16	13.8
41 LAWRENCE RD & ROSEDALE AVE	0.79	1.11	0.71	10827	6	4	3	2	0	3.0
42 HWY 53/RYMAL RD & GARTH ST	0.79	1.00	0.79	14534	4	5	7	2	2	4.0
43 CANNON ST & HUGHSON ST	0.78	0.90	0.87	20516	14	5	2	5	2	5.6
44 QUEENSTON RD & GRAYS RD (SC)	0.78	0.77	1.01	35228	10	5	16	6	11	9.6
45 MAIN ST & GAGE AVE	0.77	0.81	0.95	29776	6	8	5	11	10	8.0
46 MAIN ST & SANFORD AVE	0.76	0.80	0.94	30249	4	12	7	7	10	8.0
47 CANNON ST & OTTAWA ST	0.75	0.91	0.82	19961	4	5	13	0	4	5.2
48 MOHAWK RD & UPPER WENTWORTH ST	0.74	0.73	1.01	43835	11	12	9	12	13	11.4
49 KING ST & VICTORIA AVE (H)	0.74	0.79	0.95	33123	12	5	7	9	10	8.6
50 JACKSON ST & JOHN ST	0.74	0.91	0.81	19335	7	1	3	8	6	5.0
OVERALL STAT. FOR ALL SIGNAL INTERSECTIONS:	0.44								3.8	

NUMBER OF HAMILTON-WENTWORTH TRAFFIC SIGNAL INTERSECTIONS IN 1999 = 434



Notes:

- (a) RL is the number of collisions, per million vehicles entering the intersection, occurring within 31 feet of an individual intersection.
- (b) RC is a volume-adjusted critical rate. If RL exceeds RC (ie. RL/RC is greater than 1.0), one can state with 95 percent confidence that the collision rate at the intersection in question is significantly higher than would normally be expected.

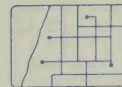
$$RC = Ra + K(\text{the square root of } (Ra/m)) + (0.5/m)$$

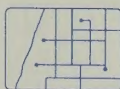
Where: Ra = systemwide average collision rate for all traffic signal locations (0.437 collisions per million vehicle entries)
K = constant (=1.65 for 95 % confidence level)
m = vehicle exposure at the location in million vehicles entering per year (AWDTx340/1,000,000)

- (c) AWDT - Average Weekday Daily Traffic (total vehicles entering the intersection).
- (d) Improved signal timing or phasing in 1996.
- (e) Run as separate phase for part of 1997, then NB/SB left-turn lanes added through reconstruction.
- (f) Added EB/WB left-turn lanes in 1999.
- (g) Improved signal display in 1996.
- (h) Under investigation for geometric improvements.
- (i) Improved signing in 1996.
- (j) Signal phasing changed in 1997.
- (k) Added NB/SB left turn lanes in 1996.
- (l) Added NB/SB left turn lane in 1997.
- (m) Signal phasing changed in 1999.
- (n) Protected only left-turn phasing installed in 1998, for EB; for all other directions in 1999.
- (o) Extra traffic used this intersection in 1999, due to reconstruction of the overpass above this intersection.
- (p) Highway #403 opened in 1998 - Traffic volumes decreased.
- (q) Traffic volumes reduced following the opening of the Lincoln Alexander Parkway in October 1997.

STOP CONTROLLED INTERSECTIONS WITH THE HIGHEST COLLISIONS FROM 1995 TO 1999

INTERSECTION	PRESENT		NUMBER OF COLLISIONS					5-YR TOTAL	5-YR AVG.	COMMENT
	TYPE OF		1995	1996	1997	1998	1999			
	STOP/CONTROL									
1 HWY 5	& HWY 52	2-WAY	12	7	8	5	11	43	8.6	(n)
2 BARTON ST (H)	& MACNAB ST	ALL-WAY	10	2	11	7	5	35	7.0	(g,k)
3 CATHARINE	& REBECCA	2-WAY	9	12	3	4	6	34	6.8	
4 CARLUKE RD	& FIDDLERS GREEN	ALL-WAY	7	5	6	9	6	33	6.6	(m,i,j,l)
5 BALMORAL	& MAIN	2-WAY	2	3	5	8	7	25	5.0	
6 KING	& TISDALE ST	2-WAY	5	8	3	4	4	24	4.8	
7 MUD RD	& FIRST RD E	2-WAY	10	1	3	3	6	23	4.6	
8 KENILWORTH ACCESS	& SHERMAN ACCESS	2-WAY	3	6	2	7	5	23	4.6	
9 CAROLINE	& CHARLTON	2-WAY	5	5	3	4	5	22	4.4	(a,b)
10 BARNESDALE	& CANNON ST	2-WAY	6	5	1	4	6	22	4.4	
11 KING ST (H)	& WEST AVE	2-WAY	3	7	7	3	2	22	4.4	
12 CATHARINE ST	& JACKSON ST	ALL-WAY	5	7	3	4	2	21	4.2	(c,d,e,f)
13 LAKE	& SOUTH SERVICE	2-WAY	4	3	2	4	7	20	4.0	(h)
14 HWY 20 S, N OF 53	& RIDGE RD	2-WAY	7	7	1	1	4	20	4.0	(o)
15 HUNTER ST	& WALNUT ST	2-WAY	5	2	6	2	4	19	3.8	
16 FIFTY	& HWY 8 (SC)	2-WAY	2	1	6	2	8	19	3.8	(h)
17 CHARLTON AVE	& VICTORIA AVE	2-WAY	3	5	7	0	4	19	3.8	
18 CANNON	& PARK ST (H)	2-WAY	2	5	3	8	1	19	3.8	
19 BARNESDALE AVE	& BARTON	2-WAY	2	2	5	5	4	18	3.6	
20 KING (H)	& EAST AVE	2-WAY	3	3	2	7	3	18	3.6	
21 KENILWORTH ACCESS	& MOUNTAIN BROW	1-WAY	4	4	4	4	2	18	3.6	
22 DUNSMURE	& OTTAWA	2-WAY	2	1	4	4	6	17	3.4	
23 MAIN	& WEIR ST	2-WAY	2	6	7	2	0	17	3.4	
24 GREEN MOUNTAIN	& HWY 20 S, N OF 53	2-WAY	2	6	4	2	3	17	3.4	
25 AUGUSTA ST	& JOHN ST	2-WAY	5	3	7	2	0	17	3.4	

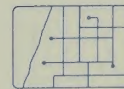




1999 Hamilton-Wentworth Collision Report Volume 1

LOCATIONS

INTERSECTION	PRESENT TYPE OF STOP/CONTROL	NUMBER OF COLLISIONS					5-YR TOTAL	5-YR AVG.	COMMENT
		1995	1996	1997	1998	1999			
26 BRUCEDALE & UPPER WELLINGTON	2-WAY	4	1	5	1	5	16	3.2	
27 FIFTY & SOUTH SERVICE	2-WAY	2	5	2	3	3	15	3.0	
28 MAIN (H) & MARGARET ST (H)	2-WAY	1	3	3	3	5	15	3.0	
29 ARVIN & MILLEN	2-WAY	3	3	0	3	5	14	2.8	
30 MAIN ST & STRATHEARNE AVE	2-WAY	4	1	1	4	4	14	2.8	
31 DUNSMURE & GAGE	2-WAY	1	2	1	7	3	14	2.8	
32 KENILWORTH & MONTEREY	2-WAY	3	2	1	3	5	14	2.8	
33 CANNON & WEST AVE (H)	2-WAY	4	5	0	2	3	14	2.8	
34 MAIN (H) & TRAGINA	2-WAY	6	3	1	0	4	14	2.8	
35 DENLOW & GARTH	2-WAY	4	1	1	5	3	14	2.8	
36 BARONS & MAIN (H)	2-WAY	3	2	5	2	2	14	2.8	
37 DUNSMURE & KENILWORTH	2-WAY	2	7	2	2	1	14	2.8	
38 GARSIDE & MAIN	2-WAY	7	3	1	2	1	14	2.8	
39 MUD & SECOND RD E	2-WAY	3	2	4	1	3	13	2.6	
40 CHARLTON & MACNAB	2-WAY	4	1	3	2	3	13	2.6	
41 BARTON ST & HUGHSON ST	2-WAY	2	4	4	3	0	13	2.6	
42 CANNON & MARY	2-WAY	1	3	0	3	6	13	2.6	
43 MUD ST & PRITCHARD RD	2-WAY	3	2	2	1	5	13	2.6	
44 COCHRANE & QUEENSTON	2-WAY	4	3	4	2	0	13	2.6	
45 CAMERON AVE (H) & MAIN (H)	2-WAY	1	3	5	3	1	13	2.6	
46 BARTON (H) & HARMONY AVE	2-WAY	5	2	3	2	1	13	2.6	
47 BRUCEDALE & UPPER JAMES	2-WAY	6	1	4	2	0	13	2.6	
48 FOREST & JOHN	2-WAY	2	3	5	1	2	13	2.6	
49 HWY #2 & SHAVER	2-WAY	8	3	1	0	1	13	2.6	
50 KENILWORTH & MAPLE AVE (H)	2-WAY	4	1	5	1	2	13	2.6	



Notes:

- (a) Installed No Stopping zone to improve visibility in 1995.
- (b) Moved hydro pole to improve visibility in 1996.
- (c) Converted to All-Way Stop in 1996.
- (d) Improved signing in 1996.
- (e) Improved lane markings in 1996.
- (f) Installed overhead flasher in 1996.
- (g) Converted to an all-way stop in 2000.
- (h) Converted to a signal in 2000.
- (i) Improved signing in 1997.
- (j) Revised flashers in 1997.
- (k) Visibility improved in 1998.
- (l) Converted to an All-Way stop in 1999.
- (m) Improved signing in 1995.
- (n) Geometric modifications planned for late 2000.
- (o) Intersection reconstructed to provide southbound left turn lane in 2000.

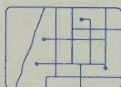
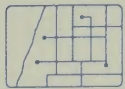


Exhibit 2.5

ARTERIAL SECTIONS WITH THE HIGHEST COLLISION RATES
FROM 1995 TO 1999
SIGNALIZED INTERSECTIONS NOT INCLUDED

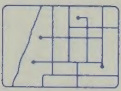
ARTERIAL STREET: From - To		Number of Collisions:	RL	RC	Ratio	Link (Km)	Volume: (AWDT)	Million Veh-Km/Yr
1	RIDGE RD: HWY 20 S N OF 53-NEW MOUNTAIN	24	9.39	8.60	1.09	2.420	577	0.47
2	MARKLAND: QUEEN H-JAMES ST H	15	7.43	5.60	1.33	0.823	1331	0.37
3	BARTON H: QUEEN H-JAMES ST H	66	5.53	2.96	1.87	0.872	7442	2.21
4	QUEENSTON H: PARKDALE-NASH	169	5.45	2.22	2.46	0.623	26936	5.71
5	RYMAL: WEST 5TH-UPPER JAMES	51	5.32	2.49	2.14	0.350	15000	1.79
6	CHARLTON: QUEEN H-JAMES ST H	49	4.93	3.07	1.61	0.823	6571	1.84
7	MAIN H: KENILWORTH-BERRY AV	168	4.92	2.22	2.21	0.702	26342	6.29
8	KING H: WELLINGTON H-WENTWORTH	157	4.81	2.33	2.06	0.866	20445	6.02
9	CARLUKE: FIDDLERS GREEN-GLANCASTER	22	4.71	4.34	1.08	1.067	2398	0.87
10	DALEWOOD AV: KING H-MAIN H	12	4.60	3.09	1.49	0.220	6433	0.48
11	CHARLTON: JAMES ST H-JOHN H	16	4.23	2.86	1.48	0.244	8446	0.70
12	BARTON H: JAMES ST H-WELLINGTON H	73	4.18	2.65	1.58	0.836	11347	3.23
13	CANNON: GAGE-OTTAWA	59	3.70	2.74	1.35	0.866	9985	2.94
14	BARTON H: SHERMAN AV-GAGE	99	3.41	2.39	1.43	0.872	18017	5.34
15	KING H: QUEEN H-JAMES ST H	127	3.11	2.23	1.39	0.860	25876	7.57
16	MAIN H: KING H-OTTAWA	63	3.10	2.17	1.43	0.366	30082	3.74
17	LIMERIDGE RD: UPPER OTTAWA-MOUNTAIN BROW BL	36	3.06	3.33	0.92	1.280	5010	2.18
18	BARTON H: WENTWORTH-SHERMAN AV	64	3.01	2.54	1.19	0.842	13637	3.90
19	QUEENSTON H: BERRY AV-PARKDALE	106	3.00	2.30	1.30	0.884	21719	6.53
20	KING H: CATHARINE-WELLINGTON H	53	3.00	2.39	1.25	0.531	18108	3.27
21	WILSON A: FIDDLERS GREEN-MOHAWK A	69	2.93	2.41	1.21	0.746	17188	4.36
22	CANNON: WELLINGTON H-WENTWORTH	72	2.86	2.46	1.16	0.866	15716	4.63
23	BARTON H: GAGE-OTTAWA	104	2.86	2.28	1.26	0.860	22862	6.68



ARTERIAL STREET: From - To	Number of Collisions:	RL	RC	Ratio	Link (Km)	Volume: (AWDT)	Million Veh-Km/Yr
24 KING H:MAIN H-OTTAWA	43	2.82	2.48	1.13	0.549	15130	2.82
25 STINSON ST:VICTORIA AV H-WENTWORTH	19	2.71	3.20	0.85	0.665	5713	1.29
26 DELAWARE:WENTWORTH-SHERMAN AV	33	2.71	2.93	0.92	0.854	7729	2.24
27 WILSON H:WELLINGTON H-WENTWORTH	57	2.70	2.55	1.06	0.860	13341	3.90
28 KING H:OTTAWA-KENILWORTH	84	2.69	2.42	1.11	0.988	17133	5.76
29 HALL:BLACKHEATH-HWY 56	3	2.61	4.58	0.57	0.300	2100	0.21
30 CANNON:SHERMAN AV-GAGE	59	2.58	2.53	1.02	0.891	13959	4.23
31 JERSEYVILLE:MARTIN A-WILSON A	36	2.58	3.74	0.69	2.147	3555	2.60
32 CHARLTON:WELLINGTON H-WENTWORTH	44	2.57	2.67	0.96	0.854	10970	3.19
33 MAIN H:OTTAWA-KENILWORTH	103	2.56	2.23	1.15	0.836	26104	7.42
34 MAIN H:SHERMAN AV-GAGE	110	2.53	2.22	1.14	0.872	26892	7.97
35 KING H:SHERMAN AV-GAGE	95	2.44	2.28	1.07	0.915	23020	7.16
36 CARLUKE:SHAVER-FIDDLERS GREEN	23	2.43	4.59	0.53	2.475	2091	1.76
37 ST JOSEPHS:JAMES ST H-MOUNTWOOD	23	2.39	2.33	1.03	0.256	20589	1.79
38 BARTON H:OTTAWA-KENILWORTH	72	2.38	2.36	1.01	0.860	19144	5.60
39 QUEENSTON S:REGIONAL LIMITS-DONN	163	2.37	2.24	1.06	1.500	25055	12.78
40 HWY 2:HWY 53-HAMILTON DR	83	2.37	2.90	0.82	2.400	8000	6.53
41 MOH A NB-EB ON RP:MOHAWK A-LAP-EB	3	2.35	4.68	0.50	0.350	2000	0.24
42 KING H:GAGE-MAIN H	56	2.34	2.31	1.01	0.610	21222	4.40
43 MAIN H:JAMES ST H-WELLINGTON H	106	2.31	2.19	1.05	0.866	28809	8.48
44 MOHAWK A:WILSON A-HWY 403	59	2.31	2.42	0.95	0.816	17036	4.73
45 BRITANNIA H:BARONS-STRATHEARNE AV	14	2.29	3.04	0.75	0.488	6791	1.13
46 FENNELL:UPPER WENTWORTH-UPPER SHERMAN	65	2.27	2.39	0.95	0.854	18201	5.28
47 BARTON H:KENILWORTH-PARKDALE	135	2.22	2.31	0.96	1.525	21621	11.21
48 CANNON:QUEEN H-JAMES ST H	67	2.20	2.35	0.94	0.848	19535	5.63
49 PARADISE:KING H-MAIN H	20	2.19	2.49	0.88	0.335	14841	1.69
50 RYMAL:UPPER WENTWORTH-UPPER SHERMAN	38	2.17	2.62	0.83	0.800	12000	3.26

1.49

OVERALL STATISTICS FOR ALL ARTERIAL STREETS:



Notes:

(a) RL is the number of collisions, per million vehicles-km per year

(b) RC is a volume-distance adjusted critical rate. If RL exceeds RC (ie. RL/RC is greater than 1.0), one can state with 95 percent confidence that the collision rate at the location in question is significantly higher than would normally be expected.

$$RC = Ra + K(\text{the square root of: } (Ra/m)) + (0.5/m)$$

Where: Ra = systemwide average collision rate for all locations of the same
 categ 1.57 collisions per million vehicle-km per year
 K = constant (=1.65 for 95 % confidence level)
 m = vehicle exposure at the location in million vehicles-km
 per year (AWDTx340xLink/1,000,000)

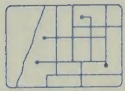
(c) AWDT is Average Weekday Daily Traffic.

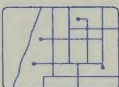
(d) Link is the road section distance in km.

Exhibit 2.6

ARTERIAL SECTIONS WITH THE HIGHEST COLLISION RATES FROM 1995 TO 1999 INTERSECTIONS NOT INCLUDED

ARTERIAL STREET: From - To	Number of Collisions	Rate (a)	CRate (b)	Ratio	Link (d) (Km)	Volume: (AWDT) (c)	Million Veh-Km/Yr
1 RYMAL: WEST 5TH-UPPER JAMES	50	5.22	1.71	3.05	0.350	15000	1.79
2 QUEENSTON H: PARKDALE-NASH	139	4.49	1.49	3.01	0.623	26936	5.71
3 KING H: QUEEN H-JAMES ST H	126	3.08	1.50	2.05	0.860	25876	7.57
4 CHARLTON: JAMES ST H-JOHN H	10	2.65	2.02	1.31	0.244	8446	0.70
5 KING H: WELLINGTON H-WENTWORTH	84	2.57	1.59	1.62	0.866	20445	6.02
6 WILSON A: FIDDLERS GREEN-MOHAWK A	56	2.38	1.65	1.44	0.746	17188	4.36
7 RIDGE RD: HWY 20 S N OF 53-NEW MOUNTAIN	6	2.35	7.03	0.33	2.426	577	0.48
8 BARTON H: JAMES ST H-WELLINGTON H	40	2.29	1.85	1.24	0.836	11347	3.23
9 KING H: CATHARINE-WELLINGTON H	40	2.26	1.63	1.39	0.531	18108	3.27
10 MAIN H: KENILWORTH-BERRY AV	75	2.20	1.50	1.47	0.702	26342	6.29
11 QUEENSTON S: REGIONAL LIMITS-DONN	148	2.15	1.51	1.42	1.500	25055	12.78
12 HWY 2: HWY 53-HAMILTON DR	72	2.05	2.06	1.00	2.400	8000	6.53
13 BRAMPTON: STRATHEARNE AV-PARKDALE	9	2.04	2.83	0.72	0.720	3355	0.82
14 RYMAL: UPPER WENTWORTH-UPPER SHERMAN	34	1.94	1.82	1.06	0.800	12000	3.26
15 DALEWOOD AV: KING H-MAIN H	5	1.92	2.21	0.87	0.220	6433	0.48
16 5TH CON: WESTOVER-MIDDLETOWN	8	1.83	5.22	0.35	2.501	957	0.81
17 MAIN H: JAMES ST H-WELLINGTON H	84	1.83	1.47	1.24	0.866	28809	8.48
18 MOHAWK A: WILSON A-HWY 403	46	1.80	1.66	1.08	0.816	17036	4.73
19 ST JOSEPHS: JAMES ST H-MOUNTWOOD	17	1.77	1.58	1.12	0.256	20589	1.79
20 LIMERIDGE RD: DEAD END-UPPER SHERMAN	33	1.75	2.39	0.73	0.570	5191	1.01
21 STONE CHURCH: UPPER JAMES-UPPER WELLINGTON	24	1.75	1.99	0.88	0.845	8882	2.55
22 BARTON H: WENTWORTH-SHERMAN AV	37	1.74	1.76	0.99	0.842	13637	3.90
23 MOHAWK H: UPPER PARADISE-GARTH	47	1.74	1.64	1.06	0.839	17571	5.01





1999 Hamilton-Wentworth Collision Report Volume 1

LOCATIONS

ARTERIAL STREET: From - To	Number of Collisions	Rate (a)	CRate (b)	Ratio	Link (d) (Km)	Volume: (AWDT) (c)	Million Veh-Km/Yr
24 JERSEYVILLE:PADDY GREENE-MARTIN A	9	1.74	4.07	0.43	1.856	1529	0.96
25 YORK BL:QUEEN H-JAMES ST H	54	1.70	1.62	1.05	0.921	18737	5.87
26 BARTON H:SHERMAN AV-GAGE	49	1.69	1.63	1.03	0.872	18017	5.34
27 HWY 53:HWY 2-FIDDLERS GREEN	50	1.59	2.42	0.66	3.450	5000	5.87
28 CANNON:GAGE-OTTAWA	25	1.57	1.92	0.82	0.866	9985	2.94
29 MOH A NB-EB ON RP:MOHAWK A-LAP-EB	2	1.57	3.56	0.44	0.350	2000	0.24
30 UP J NB-EB ON RP:UPPER JAMES-LAP-EB	2	1.57	3.56	0.44	0.350	2000	0.24
31 STONE CHURCH:UPPER WELLINGTON-UPPER WENTW	17	1.53	2.10	0.73	0.811	7472	2.06
32 LIMERIDGE RD:UPPER OTTAWA-MOUNTAIN BROW BL	18	1.53	2.42	0.63	1.280	5010	2.18
33 QUEENSTON H:BERRY AV-PARKDALE	54	1.53	1.56	0.98	0.884	21719	6.53
34 MAIN H:KING H-OTTAWA	31	1.53	1.46	1.05	0.366	30082	3.74
35 QUEENSTON H:NASH-REGIONAL LIMITS	80	1.52	1.41	1.07	0.823	34982	9.79
36 KING H:MAIN H-OTTAWA	23	1.51	1.71	0.88	0.549	15130	2.82
37 JERSEYVILLE:MARTIN A-WILSON A	21	1.50	2.76	0.54	2.147	3555	2.60
38 BARTON H:OTTAWA-KENILWORTH	45	1.49	1.61	0.92	0.860	19144	5.60
39 BARTON H:NASH-CENTENNIAL PKWY	57	1.49	1.51	0.98	0.836	25101	7.13
40 BARTON H:GAGE-OTTAWA	53	1.46	1.55	0.94	0.860	22862	6.68
41 FENNELL:WEST 5TH-UPPER JAMES	20	1.46	1.65	0.88	0.427	17459	2.53
42 KING H:KENILWORTH-PARKDALE	83	1.43	1.58	0.91	1.513	20816	10.71
43 STONE CHURCH:UPPER PARADISE-GARTH	19	1.41	2.04	0.69	0.894	8237	2.50
44 CARLUKE:SAWMILL-SHAVER	7	1.40	3.38	0.41	1.219	2246	0.93
45 WILSON A:HAMILTON DR-FIDDLERS GREEN	33	1.40	1.60	0.87	0.660	19490	4.37
46 WILSON H:JAMES ST H-WELLINGTON H	39	1.38	1.64	0.84	0.860	17855	5.22
47 KING H:OTTAWA-KENILWORTH	43	1.38	1.65	0.83	0.988	17133	5.76
48 LIMERIDGE RD:GARTH-WEST 5TH	20	1.32	2.26	0.58	1.372	6033	2.81
49 MAIN H:QUEEN H-JAMES ST H	65	1.32	1.44	0.92	0.830	32349	9.13
50 BURLINGTON:JAMES ST H-WELLINGTON H	20	1.30	1.93	0.67	0.854	9813	2.85

OVERALL STATISTICS FOR ALL ARTERIAL STREETS:

0.92



Notes:

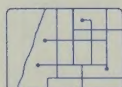
- (a) RL is the number of collisions, per million vehicles-km per year
- (b) RC is a volume-distance adjusted critical rate. If RL exceeds RC (ie. RL/RC is greater than 1.0), one can state with 95 percent confidence that the collision rate at the location in question is significantly higher than would normally be expected.

$$RC = Ra + K(\text{the square root of: } (Ra/m)) + (0.5/m)$$

Where: Ra = systemwide average collision rate for all locations of the same
 categ 1.57 collisions per million vehicle-km per year
 K = constant (=1.65 for 95 % confidence level)
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 per year (AWDTx340xLink/1,000,000)

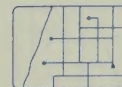
(c) AWDT is Average Weekday Daily Traffic.

(d) Link is the road section distance in km.



1999 COLLISION STATISTICS - SELECTED CANADIAN CITIES

CITY OR REGIONAL MUNICIPALITY	PROPERTY DAMAGE ONLY			COLLISION COLLISION REPORTING				COLLISIONS			INJURY								
	POPULATION	REPORTING LEVEL	CRITERIA (1)	COLLISION COLLISION REPORTING			TOTAL COLLISIONS	COLLISIONS		INJURY									
				CRITERIA (1)	LEVEL (a)	(b)		(c)	(d)	Other	POPULATION	COLLISIONS	POPULATION	COLLISIONS	POPULATION	COLLISIONS			
CITIES																			
HAMILTON	322,352	\$1,000.00	N	N	Y	Y	f	3,773	11.7	1,516	4.7								
BURLINGTON	146,300	\$1,000.00	N	N	Y	Y	e,f	2,121	14.5	550	3.8								
CALGARY	842,388	\$1,000.00	Y	Y	Y	Y	f	30,645	36.4	3,896	4.6								
EDMONTON (1998)	636,100	\$1,000.00	N	N	N	Y		19,128	30.1	5,927	9.3								
GUELPH	103,450	\$1,000.00	Y	Y	Y	Y	e,f	1,425	13.8	597	5.8								
HALIFAX	342,966	\$1,000.00	Y	Y	Y	Y		6,577	19.2	1,833	5.3								
LONDON (1998)	331,000	\$700.00	Y	Y	Y	Y		12,496	37.8	2,341	7.1								
MONTREAL (1997)	1,017,000	\$500.00	N	N	N	Y	g	22,210	21.8	4,509	4.4								
MISSISSAUGA (8) (1998)	605,000	\$1,000.00	N	N	N	Y		4,865	8.0	1,179	1.9								
REGINA (1998)	187,500	\$1,000.00	N	N	N	Y	f	5,803	30.9	1,328(3)	7.1								
SASKATOON	212,200	\$1,000.00	N	N	N	Y	f	7,557	35.6	1,359	6.4								
METRO TORONTO (1995)	2,187,000	\$700.00	Y	Y	Y	Y	e, f	49,419	22.6	16,202 (3)	7.4								
VANCOUVER (1997)	543,871	\$1,000.00	N	N	N	Y	f	6,048	11.1	2,850	5.2								
WINDSOR	202,000	\$1,000.00	N	N	N	Y		6,381	31.6	1,042	5.2								
WINNIPEG (1998)	635,000	\$1,000.00	Y	Y	Y	Y	f	17,487	27.5	5,392	8.5								



CITY OR REGIONAL MUNICIPALITY	POPULATION	PROPERTY DAMAGE ONLY			COLLISION REPORTING CRITERIA (1)			TOTAL COLLISIONS	COLLISIONS /1,000 POPULATION		INJURY COLLISIONS /1,000 POPULATION	
		COLLISION REPORTING LEVEL	(a)	(b)	(c)	(d)	Other		COLLISIONS	INJURY	COLLISIONS	INJURY
REGIONS												
REGIONAL HAMILTON-WENTWORTH (4)	467,799	\$1,000.00	N	N	Y	Y	f	5,004	10.7	2,022	4.3	
REGION OF HALTON (6)	339,875	\$700.00	N	N	Y	Y		5,257	15.5	912	2.7	
REGIONAL OTTAWA-CARLTON (1997)	721,090	\$700.00	N	N	N	Y	e,f	12,496	17.3	2,962	4.1	
REGIONAL MUNICIPALITY OF PEEL (5) (1996)	852,526	\$700.00	Y	Y	Y	Y	e,f	3,692	4.3	813	1.0	
REGIONAL WATERLOO (7) (1995)	419,150	\$700.00	Y	Y	Y	Y	f	12,716	30.3	1,668	4.0	

(1) KEY TO CRITERIA FOR REPORTING COLLISIONS (See next page for definitions of injury collisions)

It is generally assumed, unless otherwise noted, that only collisions occurring on public roadways involving personal injury or property damage greater than the reporting level are included on this table.

- (a) Collisions reported involving an infraction of the Provincial Highway Traffic Act with property damage only and less than reporting level.
- (b) Collisions reported involving an infraction of the Criminal Code of Canada with property damage only and less than reporting level.
- (c) Hit and run collisions reported with property damage only and less than reporting level.
- (d) Collisions reported if it involves any personal injury.
- (e) Public property damage collisions.
- (f) Collisions involving City or Regional government vehicles.
- (g) "With the introduction of amicable constat by insurance companies in July, 1979, a great number of accidents with material damages not reported and are out of control".

(2) Only injuries requiring medical attention were classified as injury collisions.

(3) Injury collisions do not include fatal collisions.

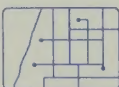
(4) Not including Kings Highways.

(5) Regional municipality statistics are for Regional roads only and do not include Burlington, in the case of Halton, or Mississauga, Brampton, or Caledon, and in the case of Peel. Thus, the collision rates stated will substantially underrepresent the actual rates for all roads within that Regional Municipality.

(6) Regional Municipality of Halton statistics are for Regional roads only, within Halton Region as provided by Halton Region Police.

(7) Regional Municipality of Waterloo statistics are for both Regional and area municipality roads. Injury collisions include fatal collisions.

(8) Data is for City roadways only, and does not include Regional roadways. Thus, the collision rates stated will underrepresent the overall rates.



DEFINITIONS OF "PERSONAL INJURY" (a)

Regional Hamilton-Wentworth	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
City of Hamilton	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
Calgary	- any type of injury resulting from a collision.
Edmonton	- including minor abrasions and bruises, complaint of pain, caused by a motor vehicle collision.
Guelph	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
Halifax	- injury or death (no stipulation regarding severity of injury) caused by a motor vehicle collision.
London	- any type of injury, visible or complained of, caused by a collision; need not be treated at a hospital.
Mississauga	- N/A
Montreal	- any injury, apparent or not, to any person, caused directly or indirectly, by a motor vehicle.
Regina	- any bodily harm, visible or complaint of, caused by the accident.
Saskatoon	- any bodily harm, visible or complaint of, caused by the accident.
Vancouver	- N/A
Windsor	- any injury resulting from a motor vehicle collision.
Winnipeg	- readily identifiable injury or perceived injury caused by a collision.
Region of Halton	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
Regional Municipality of Peel	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
Regional Ottawa-Carlton	- any bodily harm, visible or complained of, that results from a motor vehicle collision.
Region of Waterloo	- injury or death caused by a motor vehicle collision.

(a) Definitions of a "personal injury" such that a collision involving a personal injury must be reported.

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